

**Before the
Federal Communications Commission
Washington, DC 20554**

In the Matter of:

Unlicensed National Information Infrastructure
(U-NII) Devices in the 5 GHz Band

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ET Docket No. 13-49

**COMMENTS OF
THE NATIONAL PUBLIC SAFETY TELECOMMUNICATIONS COUNCIL**

The National Public Safety Telecommunications Council (NPSTC) submits these comments in response to the Commission’s Public Notice seeking to refresh the record on potential sharing solutions between proposed Unlicensed National Information Infrastructure (U-NII) devices and Dedicated Short Range Communications (DSRC) in the 5.850-5.925 GHz band.¹ As addressed in these comments, NPSTC recommends that spectrum sharing in the 5.9 GHz DSRC spectrum be pursued only if doing so would not impact the integrity and reliability of current or prospective DSRC intelligent vehicle-to-roadside or vehicle-to-vehicle operations. Accordingly, NPSTC supports comprehensive testing which incorporates real-world situations likely to be encountered if U-NII operations are ultimately allowed in the band on a shared basis with operational DSRC communications. While DSRC has only the 75 MHz of spectrum at 5.850-5.925, unlicensed U-NII operations already enjoy 580 MHz of spectrum allocated throughout the 5 GHz band.

¹ The Commission Seeks to Update and Refresh the Record in the “Unlicensed National Information Infrastructure (U-NII) Devices in the 5 GHz Band” Proceeding, ET Docket No. 13-49, DA 16-68 released June 1, 2016.

Accordingly, if the Commission decides to move forward with spectrum sharing after comprehensive testing is completed, NPSTC recommends the Commission consider whether a sharing protocol could include a provision for UNII devices first to attempt access to segments of the 5 GHz band outside the DSRC spectrum. If such a protocol is feasible, U-NII operation in the DSRC spectrum on a shared basis would occur only where and when 1) it would present no interference to DSRC operations; and 2) other channels in the 580 MHz of 5 GHz U-NII spectrum outside the DSRC band are already occupied at the given location and time.

The National Public Safety Telecommunications Council

The National Public Safety Telecommunications Council is a federation of public safety organizations whose mission is to improve public safety communications and interoperability through collaborative leadership. NPSTC pursues the role of resource and advocate for public safety organizations in the United States on matters relating to public safety telecommunications. NPSTC has promoted implementation of the Public Safety Wireless Advisory Committee (PSWAC) and the 700 MHz Public Safety National Coordination Committee (NCC) recommendations. NPSTC explores technologies and public policy involving public safety telecommunications, analyzes the ramifications of particular issues and submits comments to governmental bodies with the objective of furthering public safety telecommunications worldwide. NPSTC serves as a standing forum for the exchange of ideas and information for effective public safety telecommunications.

The following 16 organizations serve on NPSTC's Governing Board:

- American Association of State Highway and Transportation Officials
- American Radio Relay League
- Association of Fish and Wildlife Agencies
- Association of Public-Safety Communications Officials-International

Forestry Conservation Communications Association
International Association of Chiefs of Police
International Association of Emergency Managers
International Association of Fire Chiefs
International Municipal Signal Association
National Association of State Chief Information Officers
National Association of State Emergency Medical Services Officials
National Association of State Foresters
National Association of State Technology Directors
National Council of Statewide Interoperability Coordinators
National Emergency Number Association
National Sheriffs' Association

Several federal agencies are liaison members of NPSTC. These include the Department of Homeland Security (the Federal Emergency Management Agency, the Office of Emergency Communications, the Office for Interoperability and Compatibility, and the SAFECOM Program); Department of Commerce (National Telecommunications and Information Administration); Department of the Interior; and the Department of Justice (National Institute of Justice, Communications Technology Program). Also, Public Safety Europe is a liaison member. NPSTC has relationships with associate members: The Canadian Interoperability Technology Interest Group (CITIG) and the Utilities Technology Council (UTC), and affiliate members: The Alliance for Telecommunications Industry Solutions (ATIS), Open Mobile Alliance (OMA), Telecommunications Industry Association (TIA), TETRA Critical Communications Association (TCCA), and Project 25 Technology Interest Group (PTIG).

NPSTC Comments

The Commission's Public Notice seeks to refresh the record on potential sharing solutions between proposed Unlicensed National Information Infrastructure (U-NII) devices and Dedicated Short Range Communications (DSRC) in the 5.850-5.925 GHz band. DSRC is allocated the spectrum as a non-Federal Mobile Service on a primary basis. Under the

Commission's rules, the 5.850-5.925 GHz band is divided into seven 10 MHz wide channels with the lowest 5 MHz segment in the band held in reserve. Two of the channels are designated for public safety, one for control and four as service channels.²

The DSRC spectrum was allocated to enable vehicle-to-vehicle and vehicle-to-roadside communications. DSRC technologies present tremendous potential for lifesaving and safety. The National Highway Traffic Safety Administration estimates that this technology could mitigate up to 80 percent of the over four million annual unimpaired driver vehicle crashes saving thousands of lives in the process.

To the extent DSRC technology is evolving to include vehicles with assisted driving functions, DSRC channels can play a significant role in the day-to-day safety of the public. Harmful interference on these channels could have catastrophic impact if interruption of DSRC signals compromises the integrity of assisted driving functions.

Before allowing unlicensed operations to share the band, it is important for the Commission to ensure that doing so would not cause interference that could derail the advancement of DSRC communications' lifesaving potential. NPSTC recommends the Commission delve deeply into the effects that unintentional interference from unlicensed operations may pose to the safety of the public using DSRC communications. Unlicensed devices can show up anywhere at any time. The only "control" for unlicensed operation is that built into the rules and the device itself.

In the Public Notice, the Commission describes two potential spectrum sharing approaches set forth to date. The first is the "detect and avoid" approach in which the entire band would be open for both DSRC and unlicensed use. If an unlicensed device detects any transmitted DSRC signal, it would avoid using the entire DSRC band to assure no interference occurs to DSRC communications.

² See Section 90.377 of the Commission's rules and the band description included on page 5 of the Public Notice.

The second is the “re-channelization” approach. Under this sharing proposal, the band would be re-channelized with the two public safety channels and the control channel placed at the upper end of the band. This 30 MHz portion of the band would remain exclusive to DSRC operations. The service channels, totaling 40 MHz of spectrum, would be moved to the lower end, just above the 5 MHz still held in reserve. The service channels would be modified from four 10 MHz channels to two 20 MHz channels and would be open to unlicensed operations and non-safety DSRC uses. Unlicensed channels would “listen” for an open channel within this 40 MHz and transmit if one is available.

Both DSRC and U-NII proponents have studied these sharing proposals, but there is no consensus on the best approach. The Commission summarized examination of these two approaches to date as follows:

... in August 2013, the Regulatory Standing Committee of IEEE 802.11 formed “the DSRC Coexistence Tiger Team” to investigate potential mitigation techniques that might enable sharing between the proposed U-NII devices and DSRC equipment. The IEEE Tiger Team completed its work March 2015, stating that it was unable to reach a consensus on either of two proposed sharing methods, but instead submitted that further analyses and testing could follow for both methods.³

The Public Notice also sets forth a summary of the spectrum in the 5 GHz band already allocated for unlicensed U-NII devices. The bands, located at 5.150-5.350 GHz and 5.470-5.850 GHz, total 580 MHz of spectrum already allocated for U-NII.⁴ In addition, the Commission has identified an additional 120 MHz of spectrum between 5.350-5.470 GHz for U-NII as part of a future phase of this proceeding. Therefore, U-NII enjoys 580 MHz of spectrum already allocated with an additional 120 MHz identified for possible allocation in the future, all outside the DSRC band. In contrast, the DSRC allocation is limited to 75 MHz of spectrum, 5 MHz of which is still in reserve.

Accordingly, if the Commission decides to move forward with spectrum sharing after

³ Public Notice at page 6. (footnotes omitted)

⁴ Public Notice at page 2.

comprehensive testing is completed, NPSTC recommends the Commission consider whether a sharing protocol could include a provision for UNII devices first to attempt access to authorized segments of the 5.150 GHz to 5.850 GHz band outside the DSRC spectrum. If such a protocol is feasible, U-NII operation in the DSRC spectrum on a shared basis would occur only where and when 1) it would present no interference to DSRC operations; and 2) other channels in the 580 MHz of 5 GHz U-NII spectrum outside the DSRC band are already occupied at the given location and time.

The Commission also requested comment on its testing plan to assess the potential for U-NII operations to share the DSRC band on a non-interference basis. In general, the Commission proposed collaborative testing in three phases described in the Public Notice as follows:⁵

- *Phase I:* The first phase will involve testing at the FCC Laboratory in Columbia, Maryland, to determine the technical characteristics of prototype unlicensed devices and how they are designed to avoid causing harmful interference to DSRC. As part of the Phase I tests, the agencies will assess the devices' emission characteristics as well as parameters such as the threshold at which a U-NII device detects DSRC signals on a channel and the amount of time required for a device to vacate the channel so as to avoid interference for devices that will implement "detect and avoid" approaches.
- *Phase II:* The second phase will be based largely on Section 6 of the DoT Test Plan and will involve basic field tests with a few vehicles at a DoT facility. The Phase II tests will determine whether the techniques to avoid interference to DSRC that were evaluated in Phase I's lab tests are effective in the field.
- *Phase III:* The third phase will involve tests with many more vehicles, more test devices, and real-world scenarios at a suitable facility. Phase III tests may consider many of the elements discussed in Sections 4, 5, and 9 of the DoT Test Plan (*e.g.*, aggregate effects in dynamic environments).

NPSTC agrees with the Commission that testing must include both laboratory and field testing using real-world situations.⁶ It will be important to have a full understanding of how U-NII

⁵ Public Notice at page 10.

⁶ To develop its recommendations on the proposed test plan, NPSTC consulted with trusted industry engineers experienced in spectrum, interference causes and mitigation.

devices would sense and avoid DSRC channels in use as the Commission referenced in its description of the Phase I testing. This should also include how long the U-NII device monitors and the time span before it re-tries to use a channel after sensing DSRC activity. It will also be important to understand how out-of-band emissions (OOBE) impact desired channel performance as a rise in the noise floor lowers the signal-to-noise ratio, causing a decrease in range, increase in error rate and corresponding decrease in actual throughput.

The testing should also incorporate to the maximum extent possible real world conditions expected to be experienced as DSRC technology and deployment advances to enable greater traffic safety. For example, Phase III testing could include testing a use case comparable to having DSRC operation in multiple vehicles and roadside units at an urban intersection with multiple U-NII devices within and outside nearby buildings. Testing should be conducted using options under consideration for final adoption. This would include both the existing and proposed band plans. In summary, NPSTC supports a comprehensive program of laboratory and field testing to determine whether U-NII sharing in the 5.9 GHz DSRC spectrum would impact the integrity and reliability of current or prospective DSRC intelligent vehicle-to-roadside or vehicle-to-vehicle operations.

Conclusion

NPSTC supports comprehensive testing that incorporates real-world situations likely to be encountered if U-NII operations are ultimately allowed in the band on a shared basis and DSRC is operating with active vehicle-to-vehicle and vehicle-to-roadside communications. NPSTC recommends that spectrum sharing in the 5.9 GHz DSRC spectrum be pursued only if doing so would not impact the integrity and reliability of current or prospective DSRC intelligent vehicle-to-roadside or vehicle-to-vehicle operations. While DSRC has only the 75 MHz of spectrum at 5.850-5.925,

unlicensed U-NII operations already enjoy 580 MHz of spectrum allocated throughout the 5 GHz band. Accordingly, if the Commission decides to move forward with spectrum sharing after comprehensive testing is completed, NPSTC recommends the Commission consider whether a sharing protocol could include a provision for UNII devices first to attempt access to segments of the 5 GHz band outside the DSRC spectrum. If such a protocol is feasible, U-NII operation in the DSRC spectrum on a shared basis would occur only where and when 1) it would present no interference to DSRC operations; and 2) other channels in the 580 MHz of 5 GHz U-NII spectrum outside the DSRC band are already occupied at the given location and time.

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